ALBERTA HERITAGE
FOUNDATION FOR
MEDICAL RESEARCH

ANNUAL REPORT 1990-91

We're Learning a few Secrets...

92-01579/

The Alberta Heritage Foundation for Medical Research supports medical researchers at the Universities of Alberta and Calgary. It was established in 1979 by the Government of Alberta with a $300 million endowment and operates on the investment earnings of the endowment.

In the last decade, the Foundation has contributed over $350 million directly to the Alberta medical research community. The majority of these funds supports scientists recruited from Canada and around the world. Other grants support young researchers in training. A special clinical research program encourages physicians to engage in research and another special program supports commercialization of medical innovations. For a listing of grants, see page 23.

For a more complete description of all the research funded, see the 1989 Third Triennial Report and the bimonthly newsletters.

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This is the famous double helix of DNA, the master molecule of life. A molecule of DNA has about 100 billion twists and about 100 billion atoms, as many as the number of stars in a typical galaxy.

...about Life

ON BEHALF OF THE TRUSTEES of the Alberta Heritage Foundation for Medical Research, I am pleased to present the 11th Annual Report covering 1990-91 activities.

The Foundation continues to prove itself as a vehicle for building a vibrant community of medical researchers who are having a tremendous impact upon our knowledge about health and disease, upon medical education, and increasingly, on the economy of our province.

In this report, it's particularly satisfying to see some of the people who have benefitted from the most up-to-date medical care by Foundation-funded scientists and their colleagues. Certainly Alberta's health care delivery is far better today than it has ever been because of the added mass of medical researchers who give specialized care and help train our physicians of the future.

It's also fascinating for those of us who are not scientists to see how researchers are using molecular biology to uncover some of the secrets of mysterious diseases. This report shows that studies of molecules and genes are unravelling information about all kinds of health concerns, from Alzheimer's disease to high cholesterol, from feeding premature babies to cancer.

The Foundation's contribution to the economy has been building slowly and now after 12 years, is very evident. Analysis shows that Alberta's medical researchers have established such a reputation for their work and have built such strong collaborative teams, that they have attracted two outside research dollars for every dollar spent by the Foundation. That kind of return on investment is very rare. As well, some of the researchers are participating in spin-off ventures based on their laboratory discoveries.

The Foundation is constantly alert for more ways to contribute to the scientific community and to support new directions in research. For example, we are studying how, building on our current success, we might further foster the health care research Alberta and Canada so urgently require.

The Trustees are carefully examining how the interest from the endowment fund can most wisely be used to maintain our momentum and still allow for expansion in areas recommended by the Alberta community and by our national and international advisors. This is a continuing challenge, but an exciting one because the Foundation is in a position to be a catalyst for better health care and a diversified Alberta economy.

The Trustees have been most fortunate to have Dr. Matt Spence's experienced leadership in a challenging time. We are also grateful for the advice of the Scientific Advisory Council members who have supported the difficult decisions of the past year and who will continue to provide valuable guidance.

I know I speak for all the Trustees when I say the most satisfying part of our work for the Foundation is talking to the investigators about their studies. We are proud of the advances they are making and all Albertans can share that pride.

Alvin G. Libin
CHAIRMAN

TRUSTEES

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Calgary, (Chairman)

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Arthur Wilson
M.D., M.Sc., Edmonton, (Vice-Chairman)

Report from the President

THIS HAS BEEN ANOTHER YEAR OF PROGRESS for the Foundation. As this report indicates, Heritage medical researchers continue to make advances in many fields and be recognized by their peers for their contributions.

It has also been a challenging year because the remarkable successes of the last decade raises questions about how we can best design our programs to maintain or increase our momentum and respond to the health issues of the future with the financial resources available to us. We have had some difficult decisions to make regarding which scientists should advance to the Heritage Medical Scientist position, the most senior award involving long-term support that represents millions of dollars for each position.

Perhaps even more so than in business and other fields, productivity in medical research comes from a community with an ideal blend of the very best accomplished, experienced scientists and a coterie of bright, young scientists with great promise. The Foundation's challenge now and in the future is to maintain the excellence we have nurtured, allow for vital recruitment and renewal, and maintain flexibility to respond to the new research avenues of tomorrow.

Signs of progress are evident in increased technology transfer. Innovations coming out of laboratories of Heritage-supported investigators are attracting industry. Even more telling, companies are coming to the Foundation in search of scientific partners to help them develop their innovations. With this activity, the Foundation comes closer to realizing the dream of its founding fathers – to create a vehicle that would not only forward health care, but also stimulate diverse economic development in the province.

This report contains some of the highlights coming out of the laboratories of Heritage-supported investigators, but is only a sampling of the more obvious and seemingly more dramatic achievements. The majority of medical research is not dramatic, but quiet and incremental. I would like to acknowledge the individual researchers who make the fundamental, but less glamorous building blocks of our health knowledge, who do the work that may not be readily visible to people outside the scientific community but which is absolutely essential to progress. The long list of personnel and research areas at the end of this report indicates their many contributions.

During 1990-91, the Foundation was pleased to recruit more bright young investigators to Alberta. Notably, four of these new people conduct cardiology research, adding to the strength of the two outstanding cardiology groups in Calgary and Edmonton. Two others add to another exceptional group in nerve regeneration and three others join colleagues in the forefront field of oncogenesis.

I would also like to acknowledge the contribution of the physicians who struggle every day with the incredibly difficult task of balancing the responsibilities of the clinic and the demands of research. Their dedication to research and to patient care and the backing of their colleagues results in health care advances such as the ones that have made the patients in this report smile.

This year, the advice of our expert external reviewers, our application advisory panels, and particularly, the international Scientific Advisory Council has been crucial to the Foundation. The Trustees and I are grateful for their invaluable counsel in our decision-making and policy deliberations.

As an incoming president facing new challenges, I have been fortunate to work with a dedicated and attentive Board of Trustees led by an able, enthusiastic chairman.

The competence, conscientiousness and high standards of the small staff of the Foundation have been essential to an effective transition in the presidency. In addition to administrating Foundation work, the office serves as secretariat to the Alberta Foundation for Nursing Research.

In a changing world in which society attaches a high priority to health and well-being, there will always be exciting new and continuing challenges across the entire spectrum of health research. This report provides a glimpse of the present – and an inspiration for all of us to respond effectively to the opportunities of the future.

Dr. Matthew W. Spence, M.D., Ph.D.,
PRESIDENT

TAPPING NATURE'S SECRETS

THE PERIWINKLE IN YOUR GARDEN is more than just another pretty petal face. Scientifically named *vinca rosea*, it produces a cancer drug called vincristine, but only in small amounts. Dr. Hans Vogel uses nuclear magnetic resonance spectroscopy to understand the plant's metabolism and find a way to increase production of vincristine.

If herbal tea worked for great, great, great, great grandfather, it ought to work for us. Dr. Christina Benishin applies her knowledge of biochemistry to research in the Traditional Chinese Medicine Program founded by Dr. Peter Pang and Dr. Larry Wang at the U of A. The team has evidence that the fabled ginseng plant increases acetylcholine production in animals with acetycholine deficiency. The finding is interesting because Alzheimer's patients have a deficiency of acetylcholine. The team is also establishing the scientific mechanisms of herbs used for centuries in China to combat high blood pressure.

Moths, already famous for their fatal attraction to lightbulbs, ought to be congratulated for their ardent courtship. The adult sphinx moth is a regular eating machine in the caterpillar stage, but rarely eats as an adult because he's too busy flying around looking for a mate. He's sustained on stored energy, mostly lipids such as cholesterol. By studying how the stored lipids are transported to flight muscles, Dr. Robert Ryan is learning about cholesterol transport, a key to understanding cholesterol-related heart disease.

Corinne Swinarton has about seven heart attacks a month. She's alive because she carries inside her a battery-operated rescue device that monitors and regulates her heart rhythms. If she has a heart attack, the device gives her a life-giving shock to resume her heart's electrical activity.

The Heritage physicians who care for her are researching ways to make the device, called a pacemaker/ defibrillator, smaller and even more effective.

"I call it my paramedic. Now I'm not afraid to be alone," says Mrs. Swinarton.

The Secret of Her Smile . . .

SECRETS OF THE CELL

DR. IRMA PARHAD'S LATEST DISCOVERY provides hope for victims of the mysterious and devastating Lou Gehrig's Disease, also known as Amyotrophic Lateral Sclerosis (ALS). She has evidence that the spinal cord cells damaged in ALS are capable of regeneration. They respond the way other regenerating nerve cells do to initiate regrowth but, for unknown reasons, the regeneration doesn't proceed. This opens up possibilities for therapy based on promoting regeneration. Researchers are already learning how to do this with injured peripheral nerves (in a leg, arm or hand, for instance) which do regenerate on their own.

How can regrowth of peripheral nerves be encouraged? Dr. Tessa Gordon has shown that one way is by electrically stimulating injured nerves which supply limb muscles for movement. Her colleagues are learning how molecules in the cell environment, called nerve growth factors, promote growth. These findings could someday be relevant for injured spinal cord and brain cells because recently other Canadians have discovered that, contrary to dogma, central nervous system nerves can also regenerate.

CD4 is the name of the molecule that opens the door for the AIDS virus. The virus attaches to the CD4 molecule sitting on the surface of helper immune cells called T4 cells and hijacks the cells' machinery to produce more virus. This impairs the normal immune response, leaving AIDS patients prey to many infections. Dr. Chris Mody has an animal model of one of these infections and he's using it to see just how AIDS disrupts the signals among immune cells.

Hard to Keep this Secret!

When Les Bilyk sounds his trumpet, his love of music is no secret. He's back behind the music stand after brain surgery for epilepsy. The surgeon was able to accurately pinpoint the epileptic area with magnetic resonance imaging, a non-invasive technique for seeing inside the body. This is one of many new applications of the technology.

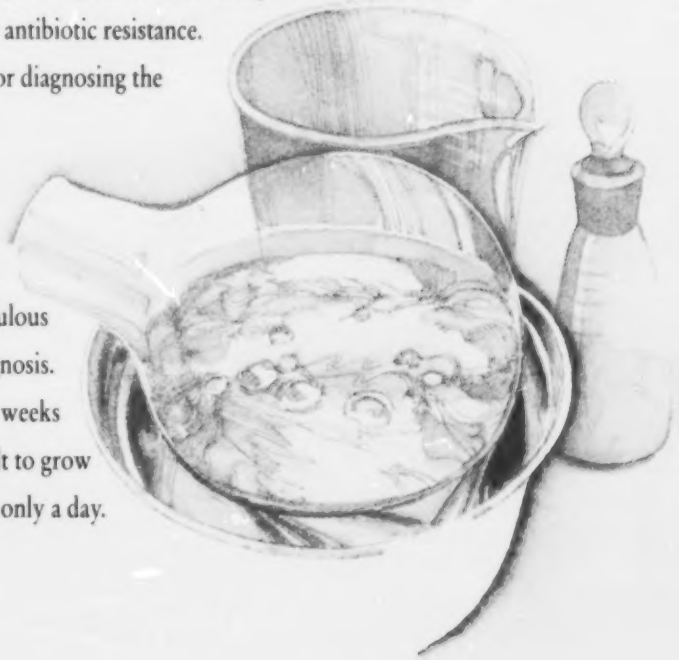
VACCINES INTENDED TO BEAT MALARIA, scourge of the Third World, haven't panned out. Dr. John Elliott has molecular biology weapons to find a more effective vaccine. He uses a new method of gene cloning and antibodies from people who are immune to malaria to find antigens that will stimulate an immune response.

Dr. Elliott collaborates with Dr. May Ho, who spends much of her search for a malarial vaccine in the field, in Thailand. Her secret weapons are also molecular biology techniques. In a search for effective vaccine antigens, she has characterized 40 malaria-specific T cell clones from the white blood cells of people immune to malaria.

SECRET WEAPONS

Dr. Diane Taylor is outsmarting smart bugs, bacteria that cause blood poisoning and other infections. These bacteria are becoming resistant to antibiotics. Using recombinant DNA technology, Dr. Taylor is discovering how small circles of bacterial DNA, called plasmids, carry antibiotic resistance. She has also developed gene probes for diagnosing the infections more quickly.

Dr. Dennis Kunimoto has used a revolutionary technology called Polymerase Chain Reaction to clone genes for many types of tuberculous bacteria. This provides a tool for diagnosis. Whereas standard tests take up to six weeks because the TB bacteria are so difficult to grow in culture, Dr. Kunimoto's test takes only a day.



Want to Hear a Secret?

When Sarah was born she had her hearing tested at the Alberta Children's Hospital by hearing specialist Dr. Stuart Coupland. He used new, sophisticated tests designed by Dr. Jos Eggermont, a Heritage researcher studying the development of hearing. The tests identify problems earlier than was previously possible so that therapy for very young children can begin when they are developing speech.

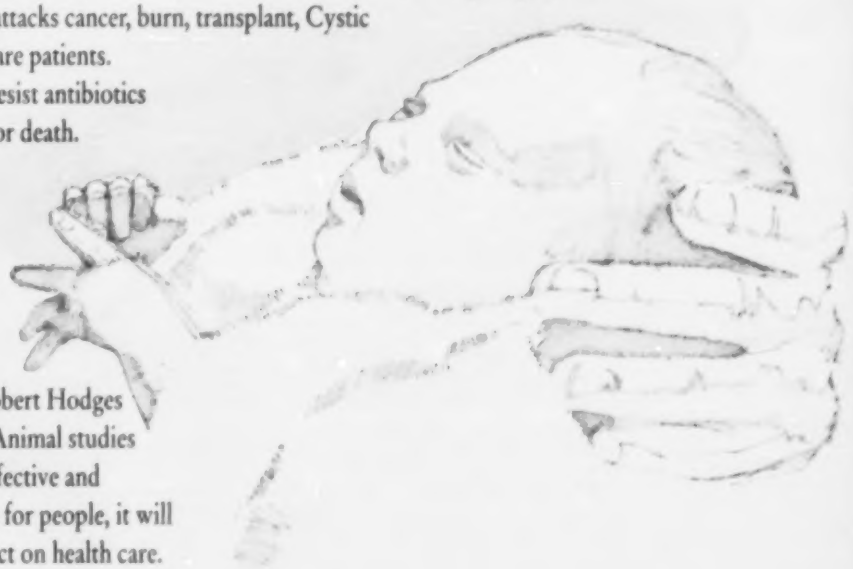
Secret of Success

THE SECRET OF SUCCESS IN THE BUSINESS OF SCIENCE or the science of business is partnerships. Partners in science and industry are crucial in taking a quivering, newborn innovation from a science lab to the big outside world of health care. That's why AHFMR promotes technology transfer by providing funds for the commercialization of health-related innovations. Here are three examples.

Coaches use biomechanics, the science of measuring body movement, to train Olympic athletes. Dr. Jack Engsberg of the University of Calgary uses biomechanics to make more comfortable and efficient below-the-knee prostheses. Working with prosthetist, George Clynch, he has developed a computer-aided design and manufacturing system that takes the trial and error out of the process for the manufacturer and pain out of the process for the client.

Some tiny premature babies born with immature lungs are surviving with a new therapy. The infants have an inadequate lining of the airway and lung, called surfactant, so they are given replacement surfactant, either synthesized or derived from pig lungs. The American and Italian pharmaceutical firms which produce the surfactant rely on the expertise of Calgary Heritage researcher, Dr. Samuel Schurch. He has created a device that mimics the lung and allows him to measure the properties of surfactant.

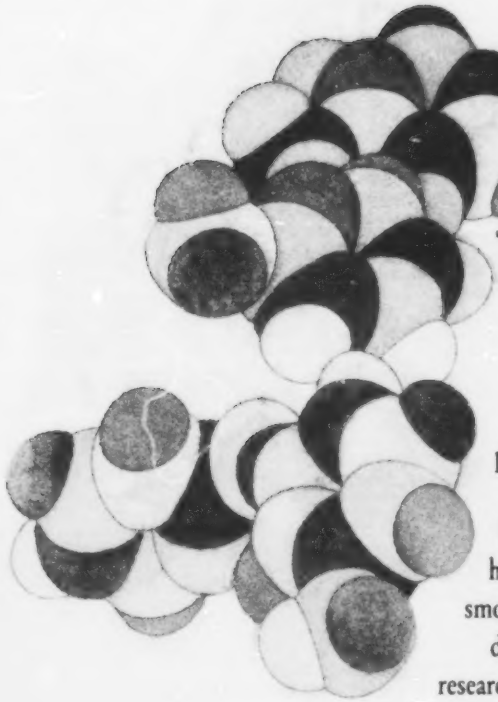
A new synthetic vaccine could defeat a common threat to vulnerable hospital patients. *Pseudomonas* infection attacks cancer, burn, transplant, Cystic Fibrosis and intensive-care patients. Too often, the bacteria resist antibiotics and cause severe illness or death. The synthetic vaccine was developed by Synthetic Peptide Inc., an Edmonton company founded in 1986 by University of Alberta protein chemists, Dr. Robert Hodges and Dr. Robert Parker. Animal studies indicate the vaccine is effective and if its promise holds true for people, it will have a tremendous impact on health care.



This winter Bob Church looks forward to getting out of the office and schussing down the ski hills again. His style has been hampered by a 10-year-old knee injury that did not heal properly. Thanks to the specialized expertise of knee surgeon Dr. Robert Bray, the knee has mended.

Dr. Bray and other Heritage researchers in the U of C Joint Injury and Diseases group tackle some of the most common and challenging medical problems.

The Secret of His Style...



THE SECRET OF BEING BOSS

TOO BAD WE CAN'T WORK OUT OUR SMOOTH MUSCLES the way we build up those beautiful pecs, lats and quadriceps. Smooth muscles inside the body line the windpipe, digestive tract and blood vessels. Dr. Michael Walsh has discovered how some "boss" proteins control contraction of smooth muscles, information particularly useful for developing better high blood pressure drugs. His research earned him the prestigious 1990 Steacie Prize, given annually to an outstanding young Canadian scientist.

Inflamed is the right word for the angry, swollen joints in arthritis. Drugs relieve the pain for some people some of the time, but not much. Dr. David Hart has found greater amounts of enzymes, called plasminogen activators, are produced in inflamed joints and apparently contribute to the destruction of cartilage. Because these same enzymes dissolve blood clots, they are currently used for heart and stroke disease. Dr. Hart is exploring new applications of plasminogen activators as drugs for the rheumatoid condition, scleroderma and for fibrotic lung disease.

If you're going to start replacing body parts, you have to deal with those boss cells in the body that make up the immune system. Fortunately, organ transplants are possible because researchers have learned how to modify the immune system to prevent rejection for many patients. Generally, the same methods are used for all situations, but sometimes it doesn't work and the donated tissue is either rejected or graft-versus-host disease results. Dr. Nollaig Parfrey has found that in these two situations, the killer cells in the immune system go after different targets, so the two conditions require different prevention strategies.

The Secrets of her Heart are Bugged!

The Secrets of Lorna Olson's heart are bugged. She has had a heart attack, but now her heart rhythms are carefully monitored by a custom-designed body surface potential mapping machine that takes readings at 117 sites (instead of 12 as in a conventional ECG) and allows physicians to see if new drugs are working for her.

The machine, engineered by Dr. Frank Witkowski, is invaluable to a Heritage team of University of Alberta cardiologists investigating new therapies.

SECRET BEGINNINGS

IF YOU WANT TO STOP A CANCER CELL, you've got to head it off at the starting gate. In molecular biology, that means going to the genes because their activity controls cell processes. Heritage researchers in Calgary and Edmonton are learning how oncogenes associated with certain human cancers initiate cell transformation. Oncogenes are genes that, when activated under certain circumstances, cause unregulated cell growth. Then there are the anti-oncogenes or tumor suppressor genes that suppress cell growth.

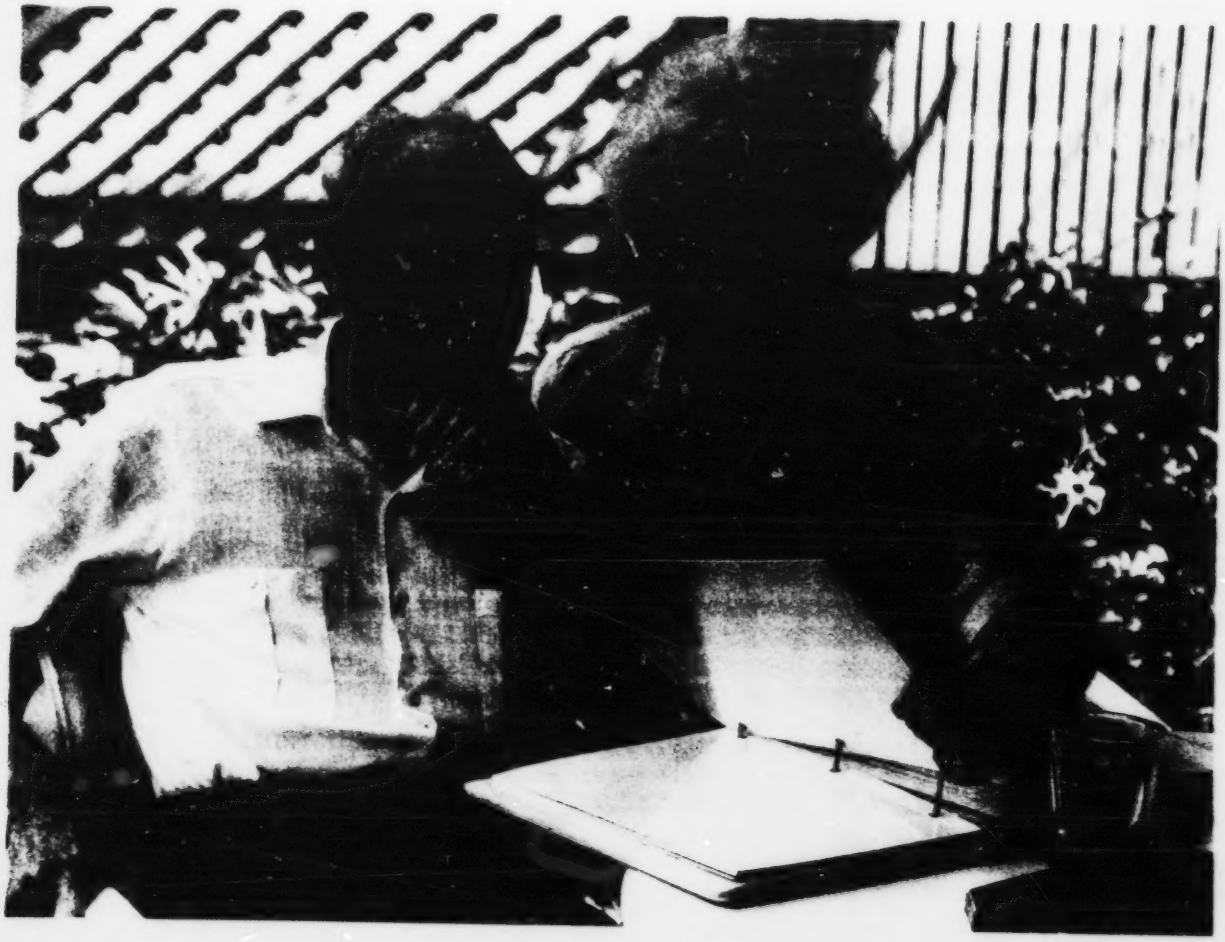
Cancer develops in a series of events, including exposure to carcinogens but many scientists think faulty genes initiate the process.

FOS, MYC, RAS and SRC – words begging for a rap song. Actually, they're all genes necessary for growth, but in some people, they become oncogenes. Dr. Charlotte Spencer studies MYC. Dr. Dallan Young tracks RAS, Dr. Don Fujita SRC, and Dr. Karl Riabowol FOS, the gene once touted as the master switch for cell growth. These researchers are learning what events turn on the oncogenes and how they influence other events.

DNA sticks to matching DNA, a happy phenomenon that allows scientists to develop gene probes to detect if an oncogene is present in tissue. Using gene probes, they've discovered that some tumors contain an abnormal number of oncogene copies. The more copies present, the faster the cancer is likely to spread or recur. Oncogene probes are being used experimentally in some cancers to predict who is at risk for relapse.

Dr. Malcolm Paterson uses a HER-2/Neu probe to predict which women with Stage I breast cancer will suffer a relapse. With Vencap support, he has founded Innogenics, a new company based on the technology.

These Joyful Memories are no Secret.



Cec Marriott and his wife, Peggy review family photos of their eight children and their grandchildren. The couple is grateful for Dr. Kowichi Jimbow's special care. Mr. Marriott has melanoma so he has benefitted from Dr. Jimbow's new tests to detect if the skin cancer has metasticized. Other new tests make earlier diagnosis possible when the disease is easily curable.

Dr. Jimbow also has a promising lead on a drug for melanoma.

SECRET CONFESSIONS

MEDICAL PROFESSIONALS DON'T OFTEN ADMIT IT, but sometimes they do things out of habit, tradition, or simply the felt need to do something for patients. Some therapies have not been validated by research. Heritage researchers are helping to change that and their findings mean better care and possibly more cost-effective care.

Dr. Paul Easton's study of low-flow oxygen therapy in Calgary nursing homes shows that at least a quarter of the people receiving chronic oxygen don't need it. Ten years ago, American studies on a younger, mobile patient group with a specific breathing problem showed this therapy saves lives. On that basis, the therapy is given to many elderly, institutionalized patients with other problems, but often the oxygen does not benefit them. It only makes them prisoner of an uncomfortable tube up their nose.

Beware the hot tub bugs. For the yuppie, they are a nuisance: for the burn patient, they can be fatal. Because burn patients are so susceptible to infections, wound cleansing is essential and traditionally done through hydrotherapy, bathing the patient in a large tub of water. Dr. Edward Tredget has discovered hydrotherapy breeds the *pseudomonas* bacteria which cause fatal infections in burn patients. Simply washing wounds with sterile water is safer and more cost-effective.

We don't know how to help people with Alzheimer's disease because we don't understand them. We don't even "see" them accurately because our preconceptions about old age and mental illness get in the way. Corinna Andiel, an AHFMR psychology student at the University of Alberta, follows hospitalized Alzheimer's patients around, coding their behavior with a tiny computer. It's part of Dr. Allan Dobb's study of Alzheimer's patient behavior in long-term care facilities to see how it relates to cognitive function. The goal is to make more informed decisions about patient care. Two years ago, another AHFMR student working with Dr. Dobbs found ways to improve the physical environment for Alzheimer's patients in a nursing home.

The Secret of her Peace of Mind...

When Monica Wilson had hip surgery, the secret of her peace of mind was a button she could push for an infusion of morphine to control pain. The system is called Patient Controlled Analgesia or PCA.

Ms. Wilson was one of the patients who helped Wendy Duggleby, a masters of nursing student, show that PCA was as appropriate for people over 65 as it is for younger patients who have successfully used the device for a few years.

"This is a wonderful device. People have less anxiety with it so they have less pain," says Ms. Wilson.

SCIENTIFIC ADVISORY COUNCIL

The 12-member Scientific Advisory Council includes representatives from the national and international research communities. They review and advise the Foundation on major applications and policy decisions related to research. The members are:

Dr. Matthew Spence, President, Alberta Heritage Foundation for Medical Research (Effective July 1, 1990)

Dr. Harold L. Atwood, Professor and Chairman, Department of Physiology, University of Toronto, Toronto, Ontario

Dr. John Bell, Senior Lecturer, Institute of Molecular Medicine, John Radcliffe Hospital, Oxford, England

Professor H. John Evans, Director, MRC Clinical and Population Cytogenetics Unit, Western General Hospital, Edinburgh, Scotland

Dr. Wolfgang K. Joklik, Chairman, Department of Microbiology and Immunology, Duke University Medical Centre, Durham, North Carolina

* **Dr. Lloyd D. MacLean**, Edward W. Archibald Professor, Chairman, Department of Surgery, McGill University, Montreal, Quebec

Dr. Barry C. McBride, Dean, Faculty of Science, University of British Columbia, Vancouver, British Columbia

Dr. Jonathan Meakins, Professor and Head, Department of Surgery, McGill University, Montreal, Quebec

* **Dr. Antony H. Melcher**, Vice-Provost, University of Toronto, Toronto, Ontario

Dr. I. Barry Pless, Professor of Pediatrics and Epidemiology, McGill University, Montreal, Quebec

Dr. Daniel Porte, Jr., Associate Chief of Staff for Research and Development, Head, Division of Endocrinology and Metabolism, University of Washington, Seattle, Washington

Dr. Bishnu D. Sanwal, Professor, Department of Biochemistry, The University of Western Ontario, London, Ontario

Dr. Rene Simard, Vice-President Academic and Research, Université de Montreal, Montreal, Quebec

Dr. Gary L. Stiles, Chief of Cardiology, Duke University Medical Center, Durham, North Carolina

* Resigned, October 1990

Selecting the Scientists

Researchers funded by the Foundation are recruited in cooperation with university personnel. The applicant and a faculty or department head submits an application to the Foundation for peer review. This means the application is judged and rated by internal and external reviewers. Applications are mailed to external reviewers with distinction in the applicant's field, then reviewed by a Foundation advisory committee which forwards recommendations to the Trustees. The following people served on these committees. (Members of the technology transfer committee are not listed to maintain confidentiality.)

Dr. D. Bazett- Jones, Associate Professor, Faculty of Medicine (Anatomy & Medical Biochemistry), U of C
Dr. W. Bridger, Chairman, Faculty of Medicine (Biochemistry), U of A
Dr. D. Brindley, Professor, Faculty of Medicine (Biochemistry), U of A
Dr. J. Brosnan, Professor, Faculty of Medicine (Biochemistry), Memorial University of Newfoundland
Dr. S. Coupland, Associate Professor, Faculty of Medicine (Pediatrics, Clinical Neurosciences & Surgery), U of C
Dr. R. Coutts, Professor, Faculty of Pharmacy, U of A
Dr. J. de Champlain, Directeur du Groupe de Recherche sur le Systeme Nerveux Autonome, Université de Montreal
Dr. J. Diamond, Professor and Head, Faculty of Medicine (Neurosciences), McMaster University
Dr. A. French, Professor, Faculty of Medicine (Physiology), U of A
Dr. W. Gallin, Assistant Professor, Faculty of Science (Zoology), U of A
Dr. J. Ginsberg, Associate Professor, Faculty of Medicine (Endocrinology), U of A
Dr. R. Hawkes, Chairman, Faculty of Medicine (Anatomy), U of C
Dr. P. Holland, Graduate Program Chairman, Montreal Neurological Institute
Dr. M. Huff, Associate Professor, Faculty of Medicine (Medicine), U of Western Ontario
Dr. M. Hulliger, Professor, Faculty of Medicine (Clinical Neurosciences & Medical Physiology), U of C
Dr. F. Jamali, Associate Professor, Faculty of Pharmacy, U of A
Dr. S. Jensen, Associate Professor, Faculty of Medicine (Microbiology), U of A
Dr. R. Johnston, Assistant Professor, Faculty of Medicine (Medical Biochemistry), U of C
Dr. C. Kay, Professor, Faculty of Medicine (Biochemistry), U of A
Dr. J. Lander, Professor, Faculty of Nursing, U of A
Dr. T. Louie, Professor, Faculty of Medicine (Microbiology & Infectious Diseases), U of C
Dr. R. Martin, Professor, Faculty of Medicine (Pediatrics), U of C
Dr. G. McFadden, Professor, Faculty of Medicine (Biochemistry), U of A
Dr. J. McGhee, Professor, Faculty of Medicine (Medical Biochemistry), U of C
Dr. R. Miller, Senior Scientist, Ontario Cancer Institute

Dr. G. Mills, Associate Professor, Obstetrics Gynecology & Immunology, Toronto General Hospital
Dr. T. Montague, Professor, Faculty of Medicine (Cardiology), U of A
Dr. K. Pearson, Professor, Faculty of Medicine (Physiology), U of A
Dr. J. Raymond, Associate Professor, Faculty of Social Sciences (Psychology), U of C
Dr. O. Rorstad, Professor, Faculty of Medicine (Medicine), U of C
Dr. W. Schneider, Associate Professor, Faculty of Medicine (Biochemistry), U of A
Dr. P. Schnetkamp, Assistant Professor, Faculty of Medicine (Medical Biochemistry), U of C
Dr. R. Scott, Associate Professor, Faculty of Medicine (Pediatrics), U of C
Dr. D. Severson, Professor, Faculty of Medicine (Pharmacology & Therapeutics), U of C
Dr. B. Smith, Chief of Neonatology, Hospital for Sick Children
Dr. H. ter Keurs, Professor, Faculty of Medicine (Medical Physiology), U of C
Dr. L. Tyrrell, Chairman, Faculty of Medicine (Microbiology & Infectious Diseases), U of A
Dr. D. van der Kooy, Associate Professor, Faculty of Medicine (Anatomy), U of Toronto
Dr. J. Wright, Associate Director, Manitoba Institute of Cell Biology, U of M

Award Programs

Heritage Medical Scientist Awards
This award encourages the recruitment and establishment of senior medical scientists to Alberta. Heritage Medical Scientists are leaders in their fields and are internationally recognized for their scientific contributions. The award is for five years and is renewable.

Scholarships
Heritage Medical Scholars are investigators recently trained in medical research who have demonstrated promise and ability to initiate and conduct independent research. A five-year, renewable Scholarship allows scientists to develop medical research unhampered by heavy teaching and service duties.

Clinical Investigatorships
Clinical Investigatorships give clinically qualified medical scientists holding full-time academic appointments further research training and experience, assisted by competitively-funded basic or clinical researchers. Clinical investigators must have an M.D. or D.D.S., have completed clinical specialty training and two or three years of supervised medical research. The three-year award may be extended for three years, but is not renewable.

Independent Establishment Grants for New Investigators
Independent Establishment Grants are given to new investigators who are not funded by the Foundation. The grant helps them quickly achieve maximal research productivity by providing equipment, technical assistance, and materials.

Fellowships
Heritage Medical Research Fellowships provide qualified candidates with full-time postdoctoral training in research in an area of medical science relevant to the aims of the Foundation. Fellows must have an M.D., D.D.S., D.V.M., Ph.D., or Pharm.D., and must demonstrate high academic standing and evidence of research ability.

Clinical Fellowships
Clinical Fellowships give individuals who have completed clinical training an opportunity to gain supervised medical research experience. Applicants must have a medical or dental degree and have completed subspecialty clinical training. The one-year award may be renewed three times.

Studentships
There are a limited number of full-time Studentships for students registered in full-time M.Sc. or Ph.D. programs, and who plan careers in medical research. A limited number of part-time Studentships are available to students working toward professional health-related degrees. Summer Studentship awards support promising Alberta university students from May to August.

Technology Transfer Grants
The Technology Transfer Program provides an opportunity for Alberta medical researchers or engineers to promote university/industrial collaboration in Alberta, stimulate technological innovation in Alberta, and advance medical research to the stage where private investors may provide seed capital.

Phase I grants enable applicants to strengthen the technical merit and explore the feasibility of a scientifically sound project. Phase II grants apply when a product or technique has been identified and laboratory tested but requires further investigation and refinement to attract seed/venture capital. Phase III grants come under the Alberta Medical Innovations Plan, funded by federal transfer grants of $9.3 million over five years. Grants of up to $500,000 fund prototype development, market research, development of production methods, start-up manufacturing and clinical trials.

Visiting Scientists
Awards for Visiting Scientists to Alberta enable a limited number of highly innovative and productive medical scientists to engage in medical research in an Alberta university to bring their special knowledge and expertise to the host department, group, or institution. Awards for

Visiting Scientists from Alberta enable Albertan's to undertake collaborative research that they are unable to undertake locally due to inadequate technology or collegial expertise.

Conference Grants

The Foundation supports a limited number of conferences and workshops clearly related to the enhancement of medical research in Alberta and the transmission of significant new knowledge to those who care for patients.

Visiting Lecturers

The Visiting Lecturer program helps Alberta universities attract outstanding medical scientists who can broaden and enrich the educational experience of graduate students and fellows. The program also gives Alberta investigators opportunities to discuss their research with others in their field.

Travel Grants

The Foundation annually gives Travel Grants to the U of A and the U of C to be administered by the Universities to faculty for: attending workshops, conferences, and annual meetings; recruiting researchers; briefly visiting other laboratories to study new techniques or discuss collaborations.

Visiting Professors

Heritage Medical Research Visiting Professorships are available to attract truly outstanding medical scientists to visit Alberta to enrich the climate of medical research.

Grants for Major Equipment

Major Equipment grants and equipment maintenance funds permit the university on behalf of investigators to purchase and maintain equipment essential to high-quality research. Applications usually relate directly to research projects supported by competitive granting agencies. Preference is given to expensive facilities providing support to groups of researchers and multidisciplinary projects, especially those facilities offering services to researchers with partial or full recovery arrangement for operating costs.

Institutional Grants

Institutional Grants to the universities cover some of the costs associated with an influx of AHFMR scientists and include items such as renovations, recruiting costs, support staff, library grants, and special initiative grants.

HERITAGE MEDICAL SCIENTISTS

ALLEN, Peter, Ph.D., Department of Applied Sciences in Medicine, Faculty of Medicine, University of Alberta "Imaging and Biochemical Applications of NMR to Medicine"

BRINDLEY, David, Ph.D., Department of Biochemistry, Faculty of Medicine, University of Alberta "Control of Glycerolipid and Lipoprotein Metabolism"

* **FIELD**, L. Leigh, Ph.D., Department of Pediatrics, Faculty of Medicine, University of Calgary "Genetic Analysis of Several Common Multifactorial Diseases"

GILES, Wayne, Ph.D., Department of Medical Physiology, Faculty of Medicine, University of Calgary "Electrophysiology- Pharmacology of Cardiac Cells"

GRIFFITHS, Derek, Ph.D., Department of Applied Sciences in Medicine, Faculty of Medicine, University of Alberta "Urodynamics"

HULLIGER, Manuel, Ph.D., Departments of Clinical Neurosciences and Medical Physiology, Faculty of Medicine, University of Calgary "Peripheral Control of Voluntary Movement in Man and Cat"

JIMBOW, Kowichi, M.D., Ph.D., Department of Medicine, Faculty of Medicine, University of Alberta "Genesis, Laboratory Diagnosis a Therapy of Malignant Melanoma"

JUGDUTT, Bodh, M.D., Department of Medicine, Faculty of Medicine, University of Alberta "Modification of Ventricular Shape and Function During Healing After Myocardial Infarction"

MARTIN, Renee, Ph.D., Department of Pediatrics, Faculty of Medicine, University of Calgary "Cytogenetic Analysis of Human Sperm"

McGHEE, James, Ph.D., Department of Medical Biochemistry, Faculty of Medicine, University of Calgary "Gene Expression During Animal Development"

PATERSON, Malcolm, Ph.D., Department of Medicine, Cross Cancer Institute "Clinical Genetics and Molecular Carcinogenesis"

PAUL, Leendert, M.D., Ph.D., Department of Medicine, Faculty of Medicine, University of Calgary "Organ Transplant: Program of Clinical and Experimental Research"

* **PITTMAN**, Quentin, Ph.D., Department of Medical Physiology, Faculty of Medicine, University of Calgary "Hypothalamic Control of Autonomic and Endocrine Function"

RABINOVITCH, Alexander, M.D., Department of Medicine, Faculty of Medicine, University of Alberta "Immunobiology of Diabetes Mellitus"

REMMERS, John, M.D., Department of Medicine, Faculty of Medicine, University of Calgary "Control of Breathing by the Nervous System"

* **SCHNEIDER**, Wolfgang, Ph.D., Department of Biochemistry, Faculty of Medicine, University of Alberta "Receptor-Mediated Endocytosis in Oocytes"

SINGH, Bhagirath, Ph.D., Department of Immunology, Faculty of Medicine, University of Alberta "Mechanism and Regulation of Antigen Recognition by T-Lymphocytes"

TER KEURS, Henk, M.D., Ph.D., Departments of Medicine and Medical Physiology, Faculty of Medicine, University of Calgary "Activation and Contraction of the Heart"

TYBERG, John, M.D., Ph.D., Departments of Medicine and Medical Physiology, Faculty of Medicine, University of Calgary "Cardiac Mechanics: Factors Affecting the Heart's Pumping Action"

VANCE, Dennis, Ph.D., Department of Biochemistry, Faculty of Medicine, University of Alberta "Phospholipid and Lipoprotein Metabolism"

WANG, Jerry, Ph.D., Department of Medical Biochemistry, Faculty of Medicine, University of Calgary "Studies in Cell Regulation"

YOON, Ji-Won, Ph.D., Department of Microbiology and Infectious Diseases, Faculty of Medicine, University of Calgary "Two Possible Mechanisms for the Pathogenesis of Virus-Induced Diabetes Mellitus"

* **YOUNG**, James, Ph.D., Department of Physiology, Faculty of Medicine, University of Alberta "Molecular Mechanisms of Membrane Transport"

* New appointments 1990/91

HERITAGE MEDICAL SCHOLARS

ACHESON, Ann, Ph.D., Department of Anatomy and Cell Biology, Faculty of Medicine, University of Alberta "Role of Cell Adhesion in Neurotransmitter Phenotypic Expression"

ANDERSON, M. John, Ph.D., Department of Pharmacology and Therapeutics, Faculty of Medicine, University of Calgary "Development of the Neuromuscular Junction"

ANDERSON, Robert, Ph.D., Department of Microbiology and Infectious Diseases, Faculty of Medicine, University of Calgary "Control of Virus Synthesis and Assembly"

AUER, Roland, Ph.D., M.D., Department of Pathology, Faculty of Medicine, Faculty of Medicine, University of Calgary "Neuronal Death in Ischemia, Hypoglycemia, and Epilepsy"

* **BARNES**, Steven, Ph.D., Department of Medical Physiology, Faculty of Medicine, University of Calgary "Mechanisms of Synaptic Interaction Among Photoreceptors of the Vertebrate Retina"

BAZETT-JONES, David, Ph.D., Departments of Anatomy and Medical Biochemistry, Faculty of Medicine, University of Calgary "Ultrastructure of Transcription Complexes"

BEFUS, Dean, Ph.D., Department of Microbiology and Infectious Diseases, Faculty of Medicine, University of Calgary "Studies of Intestinal Immunity and Mast Cells"

BENISHIN, Christina, Ph.D., Department of Physiology, Faculty of Medicine, University of Alberta "Presynaptic Modulation of Potassium Channels"

BERDAN, Robert, Ph.D., Department of Physiology, Faculty of Medicine, University of Alberta "Formation and Function of Electrical Synapses"

BLEACKLEY, Robert, Ph.D., Department of Biochemistry, Faculty of Medicine, University of Alberta "Molecular Genetics of T-Cell Differentiation"

BOISVERT, Donald, Ph.D., M.D., Department of Surgery, Faculty of Medicine, University of Alberta "Pathophysiology and Therapy of Cerebrovascular Occlusion"

BOWLING, Douglas, Ph.D., Department of Medical Physiology, Faculty of Medicine, University of Calgary "Projections of Single Identified Retinal Axons"

BULLOCH, Andrew, Ph.D., Department of Medical Physiology, Faculty of Medicine, University of Calgary "Cellular Basis of Adult Neuronal Plasticity"

CAMPENOT, Robert, Ph.D., Department of Anatomy and Cell Biology, Faculty of Medicine, University of Alberta "Control of Nerve Fiber Growth and Survival by Ions, Pharmacological Agents and Electrical Activity"

CLANDININ, Michael, Ph.D., Departments of Foods and Nutrition and Medicine, Faculties of Home Economics and Medicine, University of Alberta "Nutrition and Metabolism of Dietary Fat"

CODDING, Penelope, Ph.D., Departments of Chemistry and Pharmacology and Therapeutics, Faculties of Science and Medicine, University of Calgary "Molecular Structure and Function Studies of CNS Active Drugs and Toxins"

COLMERS, William, Ph.D., Department of Pharmacology, Faculty of Medicine, University of Alberta "Neuromodulation in CNS"

DAY III, Rufus, Ph.D., Department of Medicine, Cross Cancer Institute "DNA Repair and Gene Regulation in Human Tumor Systems"

DUFF, Henry, M.D., Department of Medicine, Faculty of Medicine, University of Calgary "Mechanistic Approach to Antiarrhythmic Therapy"

DUNN, Susan, Ph.D., Department of Pharmacology, Faculty of Medicine, University of Alberta "Mechanisms of GABAergic Neurotransmission"

EASTON, Paul, M.D., Department of Medicine, Faculty of Medicine, University of Calgary "Hypoxia, Respiratory Muscles and Ventilatory Control"

EDWARDS, Dylan, Ph.D., Department of Pharmacology and Therapeutics, Faculty of Medicine, University of Calgary "Growth Factor Control of Gene Regulation"

EGGERMONT, Jos, Ph.D., Department of Psychology, Faculty of Social Sciences, University

* New appointments 1990/91

of Calgary "Functional Plasticity of the Auditory Nervous System"

ELLIOTT, John, M.D., Ph.D., Department of Microbiology and Infectious Diseases, Faculty of Medicine, University of Alberta "Cloning of Genes for Malaria Surface Antigens by Eukaryotic Expression"

FAMIGLIETTI, Edward, M.D., Ph.D., Department of Anatomy, Faculty of Medicine, University of Calgary "Functional Architecture of Vertebrate Retina"

FEWELL, James, Ph.D., Departments of Obstetrics and Gynecology and Medical Physiology, Faculty of Medicine, University of Calgary "Cardio-respiratory Control During Sleep"

FINEGOOD, Diane, Ph.D., Departments of Medicine and Physiology, Faculty of Medicine, University of Alberta "Hepatic Insulin Action and Insulin Resistance"

FLIEGEL, Larry, Ph.D., Department of Pediatrics, Faculty of Medicine, University of Alberta "Ion Exchangers of Heart Sarcolemma"

FOTEDAR, Arun, Ph.D., M.D., Department of Immunology, Faculty of Medicine, University of Alberta "T-Cell Recognition"

FRANK, Cyril, M.D., Ph.D., Department of Surgery, Faculty of Medicine, University of Calgary "Connective Tissue Structure and Function"

FRENCH, Robert, Ph.D., Department of Medical Physiology, Faculty of Medicine, University of Calgary "Ionic Channels in Excitable Membranes"

FRITZLER, Marvin, Ph.D., M.D., Departments of Medicine and Medical Biochemistry, Faculty of Medicine, University of Calgary "Antinuclear Antibodies in Autoimmune Diseases"

FUJITA, Donald, Ph.D., Department of Medical Biochemistry, Faculty of Medicine, University of Calgary "Control of Oncogene Activity"

GALLIN, Warren, Ph.D., Department of Zoology, Faculty of Science, University of Alberta "Cellular Mechanisms of Development"

GARBER, Anthony, Ph.D., Department of Medical Biochemistry, Faculty of Medicine, University of Calgary "The Molecular Biology of Psoriasis"

GELLMAN, Reuben, Ph.D., Departments of Clinical Neurosciences and Medical Physiology, Faculty of Medicine, University of Calgary "Processing of Oculomotor Signals in the Cerebellum"

GODBOUT, Roseline, Ph.D., Department of Anatomy & Cell Biology, Faculty of Medicine, University of Alberta "Molecular Genetics of Retinal Development"

GORDON, Tessa, Ph.D., Department of Pharmacology, Faculty of Medicine, University of Alberta "Neuromuscular Plasticity"

GREEN, Douglas, Ph.D., Department of Immunology, Faculty of Medicine, University of Alberta "Immunoregulatory T-Cells and Molecules"

GREENSHAW, Andrew, Ph.D., Department of Psychiatry, Faculty of Medicine, University of Alberta "Beta-Phenylethylamine, p-Tyramine and p-Octopamine and the Treatment of Affective Disorders"

HART, David, Ph.D., Departments of Medicine and Microbiology and Infectious Diseases, Faculty of Medicine, University of Calgary "Immunochemical Characterization of Plasminogen Activators"

HAYNES, Lawrence, Ph.D., Department of Medical Physiology, Faculty of Medicine, University of Calgary "Properties of the cGMP-gated channel of vertebrate rods and cones"

HOFFER, J. Andy, Ph.D., Departments of Medical Physiology and Clinical Neurosciences, Faculty of Medicine, University of Calgary "Neural Control of Movements"

HULBERT, William, Ph.D., Department of Medicine, Faculty of Medicine, University of Alberta "The Effect of H2S on Airway Structure and Function"

IATROU, Kostas, Ph.D., Department of Medcial Biochemistry, Faculty of Medicine, University of Calgary "The Organization, Expression and Evolution of Eukaryotic Multigene Families in Chorion of Bombyx Mori"

JACOBS (KAUFMAN), Susan, Ph.D., Department of Medicine, Faculty of Medicine, University of Alberta "Control Mechanisms of Fluid and Electrolyte Balance"

JENSEN, Susan, Ph.D., Department of Medical

Microbiology and Infectious Diseases, Faculty of Science, University of Alberta "Biosynthesis of Novel Penicillin and Cephalosporin Antibiotics"

* **KARGACIN**, Gary, Ph.D., Department of Medical Physiology, Faculty of Medicine, University of Calgary "Structural Properties of Contracting Smooth Muscle"

KING, Malcolm, Ph.D., Department of Medicine, Faculty of Medicine, University of Alberta "Studies on Mucus Clearance"

KOOPMANS, Henry, Ph.D., Department of Medical Physiology, Faculty of Medicine, University of Calgary "The Internal Control of Food Intake"

LAFRENIERE, Rene, M.D., Department of Surgery, Faculty of Medicine, University of Calgary "Adoptive Immunotherapy of Tumors with Activated Lymphocytes and Biological Response Modifiers"

LAU, David, M.D., Ph.D., Department of Medicine, Faculty of Medicine, University of Calgary "Regulation of Adipose Tissue Development and Growth"

LEE, Patrick, Ph.D., Department of Microbiology and Infectious Diseases, Faculty of Medicine, University of Calgary "The Mechanism of Virus Attachment of Host Cells"

LEE, Timothy, Ph.D., Department of Microbiology and Infectious Diseases, Faculty of Medicine, University of Calgary "Protective Immunity of Nematode Infection"

LOPASCHUK, Gary, Ph.D., Department of Pediatrics and Pharmacology, Faculty of Medicine, University of Alberta "Fatty Acid Metabolism in the Heart"

MacVICAR, Brian, Ph.D., Department of Medical Physiology, Faculty of Medicine, University of Calgary "Neuronal Basis for Synchrony During Seizure"

MAINS, Paul, Ph.D., Department of Medical Biochemistry, Faculty of Medicine, University of Calgary "Molecular and Genetic Analysis of C. elegans Embryogenesis"

MANTLE, Michele, Ph.D., Departments of Medical Biochemistry and Pediatrics, Faculty of Medicine, University of Calgary "Structure, Synthesis and Secretion of Intestinal Mucus"

MARTIN-IVERSON, Mathew, Ph.D., Department of Psychiatry, Faculty of Medicine, University of Alberta "Behavioral Functions of Dopamine Receptor Subtypes"

McFADDEN, Grant, Ph.D., Department of Biochemistry, Faculty of Medicine, University of Alberta "Molecular Biology of Tumorogenic Shope Fibroma Poxviruses"

MICHALAK, Marek, Ph.D., Departments of Pediatrics and Biochemistry, Faculty of Medicine, University of Alberta "Ca Transport Systems in Mature and Developing Heart"

MILLER, Freda, Ph.D., Department of Anatomy and Cell Biology, Faculty of Medicine, University of Alberta "Molecular Analysis of Neuronal Development"

MITCHELL, L. Brent, M.D., Department of Medicine, Faculty of Medicine, University of Calgary "Prophylactic Therapy for Ventricular Tachyarrhythmias"

MOORE, Graham, Ph.D., Department of Medical Biochemistry, Faculty of Medicine, University of Calgary "The Synthesis and Evaluation of Peptide Hormones and Analogues"

NEWMAN, Stephen, M.D., Department of Psychiatry, Faculty of Medicine, University of Alberta "Mortality of Affective Disorder Patients in Alberta"

PARHAD, Irma, M.D., Departments of Pathology and Clinical Neurosciences, Faculty of Medicine, University of Calgary "Neurofibrillary Degeneration: Pathogenic Mechanisms"

PREIKSAITIS, Jutta, M.D., Departments of Medicine and Medical Microbiology and Infectious Diseases, Faculty of Medicine, University of Alberta "Transfusion Acquired Cytomegalovirus Infection: Epidemiology and Immune Response in Man"

PROCHAZKA, Arthur, Ph.D., Department of Physiology, Faculty of Medicine, University of Alberta "Neural Control of Mammalian Movement"

RATTNER, Jerome, Ph.D., Departments of Medical

Biochemistry and Anatomy, Faculty of Medicine, University of Calgary "High Order Structure of Chromosomes"

READ, Randy, Ph.D., Department of Medical Microbiology and Infectious Diseases, Faculty of Medicine, University of Alberta "Protein Crystallography and Rational Design of Trypanocidal Drugs"

REHA-KRANTZ, Linda, Ph.D., Department of Genetics, Faculty of Science, University of Alberta "The Biochemical Basis of Mutation"

REYNOLDS, John, Ph.D., Department of Medical Physiology, Faculty of Medicine, University of Calgary "Studies of the Intestinal Immune System"

* **RICE**, Stephen, Ph.D., Department of Biochemistry, Faculty of Medicine, University of Alberta "Molecular Biology of a Herpes Simplex Virus Regulatory Protein"

RORSTAD, Otto, M.D., Ph.D., Department of Medicine, Faculty of Medicine, University of Calgary "Mechanisms of Action of Brain Peptides"

RYAN, Robert, Ph.D., Department of Biochemistry, Faculty of Medicine, University of Alberta "Hormone-Induced Diacylglycerol Transport and Metabolism"

SCHNETKAMP, Paul, Ph.D., Department of Medical Biochemistry, Faculty of Medicine, University of Calgary "Visual Transduction in Rod Photoreceptors"

SCHRYVERS, Anthony, Ph.D., M.D., Department of Microbiology and Infectious Diseases, Faculty of Medicine, University of Calgary "The Receptors for Human Transferrin and Lactoferrin in Neisseria meningitidis"

SCHURCH, Samuel, Ph.D., Departments of Medicine and Medical Physiology, Faculty of Medicine, University of Calgary "Lung Stability and Cell Adhesion"

SEVERSON, David, Ph.D., Department of Pharmacology and Therapeutics, Faculty of Medicine, University of Calgary "Lipid Metabolism in Heart and Blood Vessels"

SIMINOSKI, Kerry, M.D., Department of Medicine, Faculty of Medicine, University of Alberta "Regulation of Nerve Growth Factor Activity"

SMITH, Peter, Ph.D., Department of Pharmacology, Faculty of Medicine, University of Alberta "Electrophysiological Studies of the Electrogenic Sodium Pump in Sympathetic Ganglia and Spinal Cord"

SNYDER, Floyd, Ph.D., Departments of Medical Biochemistry and Pediatrics, Faculty of Medicine, University of Calgary "Studies of Inherited Disorders of Nucleotide Metabolism"

SOKOL, Pamela, Ph.D., Department of Microbiology and Infectious Diseases, Faculty of Medicine, University of Calgary "Role of Iron in the Pathology of Pseudomonas Infection"

* **SPENCER**, Charlotte, Ph.D., Department of Biochemistry, Faculty of Medicine, University of Alberta "Transcription Initiation and Elongation in the Human c-myconogene"

STEVENSON, Bruce, Ph.D., Department of Anatomy and Cell Biology, Faculty of Medicine, University of Alberta "Molecular Dynamics of ZO-1 and the Tight Junction"

TAYLOR, Diane, Ph.D., Department of Medical Microbiology and Infectious Diseases, Faculty of Medicine, University of Alberta "Characterization of Bacterial Plasmids"

TETZLAFF, Wolfgang, M.D., Ph.D., Department of Anatomy, Faculty of Medicine, University of Calgary "Gene Expression in Lesioned Neurons of the CNS and PNS"

VOGEL, Hans, Ph.D., Department of Biochemistry and Biological Sciences, Faculty of Science, University of Calgary "NMR Studies of Mechanistic and Regulatory Aspects of Metabolism"

WAISMAN, David, Ph.D., Department of Medical Biochemistry, Faculty of Medicine, University of Calgary "Studies of Calcium Binding Proteins"

WALLACE, John, Ph.D., Department of Medical Physiology, Faculty of Medicine, University of Calgary "Endogenous Mediators of Gastrointestinal Pathophysiology"

WALSH, Michael, Ph.D., Department of Medical Biochemistry, Faculty of Medicine, University of Calgary "Enzyme Regulation by Calcium"

WENMAN, Wanda, M.D., Department of Pediatrics, Faculty of Medicine, University of Alberta "Human

HERITAGE CLINICAL INVESTIGATORS

Infections with Chlamydia Trachomatis"

* **WINDHORST**, Uwe, M.D., Department of Clinical Neurosciences and Medical Physiology, Faculty of Medicine, University of Calgary "Integration of Recurrent Inhibition and Propriospinal Feedback"

WITKOWSKI, Francis, M.D., Department of Medicine, Faculty of Medicine, University of Alberta "Autonomic Neural Influences in Arrhythmogenesis"

WONG, Norman, M.D., Department of Medicine, Faculty of Medicine, University of Calgary "Mechanism of Thyroid Hormone Action"

WONG, Sui-Lam, Ph.D., Department of Biological Sciences, Faculty of Science, University of Calgary "Gene Regulation and Secretion in Bacillus Subtilis"

WOODS, Donald, Ph.D., Department of Microbiology & Infectious Diseases, Faculty of Medicine, University of Calgary "Pathogenesis of Pseudomonas Aeruginosa Disease"

WYSE, George, Ph.D., M.D., Departments of Medicine and Pharmacology and Therapeutics, Faculty of Medicine, University of Calgary "Investigations in Hypertension and Electrophysiology"

YOKOYAMA, Shinji, M.D., Ph.D., Department of Medicine, Faculty of Medicine, University of Alberta "Mechanism of Reverse Cholesterol Transport"

* **YOUNG**, Dallan, Ph.D., Department of Medical Biochemistry, Faculty of Medicine, University of Calgary "Signal Transduction Pathways in the Schizosaccharomyces Pombe and Mammals"

ZACKSON, Saul, Ph.d., Department of Medical Biochemistry, Faculty of Medicine, University of Calgary "Cellular and Molecular Analysis of a Morphogenetic Cell Migration"

ZWIERS, Hindrik, Ph.D., Departments of Medical Physiology and Medical Biochemistry, Faculty of Medicine, University of Calgary "Neuropeptides, Phosphoproteins, and Neural Plasticity"

BERTHIAUME, Yves, M.D., Department of Medicine, Faculty of Medicine, University of Calgary "Mechanisms of Alveolar Liquid Clearance"

* **BRAY**, Robert, M.D., Department of Surgery, Faculty of Medicine, University of Calgary "Revascularization and Ligament Healing"

BUTZNER, J. Decker, M.D., Department of Pediatrics, Faculty of Medicine, University of Calgary "Chronic Protein-Calorie Malnutrition in the Developing Infant."

CHIK, Constance, M.D., Ph.D., Department of Medicine, Faculty of Medicine, University of Alberta "The Pineal Gland: a Model for Ethanol Action on Neuroendocrine Function"

* **COCKFIELD**, Sandra, M.D., Department of Medicine, Faculty of Medicine, University of Alberta "The Regulation of Interferon-T and other Cytokines In Vivo"

COE, James, M.D., Department of Pediatrics, Faculty of Medicine, University of Alberta "Pharmacological Manipulation of the Neonatal Circulation"

FEDORAK, Richard, M.D., Department of Medicine, Faculty of Medicine, University of Alberta "Adaptation and Regulation of Intestinal Glucose Transport"

FLETCHER, William, M.D., Department of Clinical Neurosciences, Faculty of Medicine, University of Calgary "Visual Motor Dysfunction with Frontal Lobe Lesions"

GILLIS, Anne, M.D., Department of Medicine, Faculty of Medicine, University of Calgary "Myocardial Kinetics and Pharmacodynamics"

GRUNDY, Paul E., M.D., Department of Molecular Genetics and Carcinogenesis Laboratory, Cross Cancer Institute "Molecular Genetics of Wilms' Tumor"

HO, May, M.D., Department of Microbiology and Infectious Diseases, Faculty of Medicine, University of Calgary "Immunoregulation in P. Falciparum Malaria"

* **KAVANAGH**, Katherine, M.D., Department of Medicine, Faculty of Medicine, University of Alberta "Mechanisms of Cardiac Defibrillation and Cardioversion"

* New appointments 1990/91

KNETEMAN, Norman, M.D., Department of Surgery, Faculty of Medicine, University of Alberta "Islet Isolation, Immunodulation and Immunosuppression"

KUNIMOTO, Dennis, M.D., Department of Medical Microbiology and Infectious Diseases, Faculty of Medicine, University of Alberta "IgA Regulation"

LEE, B. Craig, M.D., Department of Microbiology and Infectious Diseases, Faculty of Medicine, University of Calgary "The Role of Iron Acquisition in the Pathogenesis of Gonococcal Infection"

LEE, Samuel, M.D., Department of Internal Medicine, Faculty of Medicine, University of Calgary "Pathophysiology of Portal Hypertension"

LIEN, Dale, M.D., Department of Medicine, Faculty of Medicine, University of Alberta "Neutrophils in Airway Inflammation"

LUCAS, Alexandra R., M.D., Department of Medicine, Faculty of Medicine, University of Alberta "Spectroscopic Investigation of Atherosclerotic Plaque Development"

MEDDINGS, Jonathan, M.D., Department of Medicine, Faculty of Medicine, University of Calgary "Physiology of Intestinal Permeability"

MODY, Christopher H., M.D., Department of Medicine, Faculty of Medicine, University of Calgary "Antimicrobial Defense Mechanisms of the Lung in CD 4 Cell Deficiency"

PARFREY, Nollaig, M.D., Department of Pathology, Faculty of Medicine, University of Alberta "Immune Mechanisms in Self Tolerance and Autoimmunity"

SCOTT, R. Brent, M.D., Department of Pediatrics, Faculty of Medicine, University of Calgary "Gastrointestinal Motor Function"

* **TEO**, Koon, MBBCH, Ph.D., Department of Medicine, Faculty of Medicine, University of Alberta "Clinical Trials in Cardiovascular Diseases"

TRANMER, Bruce, M.D., Department of Clinical Neurosciences, Faculty of Medicine, University of Calgary "The Role of Hypervolemic Hemodilution During Cerebral Ischemia"

TREDGET, Edward, M.D., Department of Surgery, Faculty of Medicine, University of Alberta "Collagen Metabolism In Vivo"

VAN AERDE, Johny, M.D., Department of Pediatrics, Faculty of Medicine, University of Alberta "Fat Utilization in Parenterally Fed Newborn Infants"

WARNOCK, Garth, M.D., Department of Surgery, Faculty of Medicine, University of Alberta "Transplantation of Human Islets of Langerhans"

WATSON, Timothy W., M.D., Ph.D., Department of Clinical Neurosciences, Faculty of Medicine, University of Calgary "Somatostatin Actions in the In Vitro Striatal Slice"

* **WOODMAN**, Richard, M.D., Department of Medicine, Faculty of Medicine, University of Calgary "Identification and Functional Characterization of Neutrophil Antibodies and their Associated Antigens"

TABLE 1: NEW GRANTS AND AWARDS IMPLEMENTED FOR THE 1990-91 AWARD YEAR

Number and Value of Grants and Awards*

AWARD CATEGORY	U OF A	U OF C	OTHERS	TOTALS
Studentship				
– Full-Time	$ 276,387 (21)	$ 284,791 (29)	$ –	$ 561,178 (50)
– Part-Time	16,500 (4)	–	–	16,500 (4)
– Summer	381,000 (93)	196,000 (48)	–	577,000 (141)
Fellowship				
– Full-Time	316,593 (14)	224,935 (12)	91,496 (7)	633,024 (33)
– Part-Time	–	–	–	–
– Dental	29,560 (1)	–	–	29,560 (1)
Clinical Fellowship	40,960 (1)	46,160 (1)	12,580 (2)	99,700 (4)
Clinical Investigatorship/ + Establishment Grant	630,208 (3)	422,000 (2)	–	1,052,208 (5)
Scholarship/Establishment + Grant	1,046,925 (4)	798,000 (4)	–	1,844,925 (8)
Heritage Medical Scientist/ ** Establishment Grant	580,000 (2)	– (2)	–	580,000 (4)
Independent Establishment Grant	1,138,853 (8)	686,500 (3)	–	1,825,353 (11)
Major Equipment Grant	237,775 (7)	–	–	237,775 (7)
Conference Grant	50,000 (9)	33,000 (8)	5,000 (1)	88,000 (18)
Visiting Scientist				
– To Alberta	–	32,500 (1)	–	32,500 (1)
– From Alberta	–	–	–	–
Visiting Professor	1,525 (1)	4,475 (3)	–	6,000 (4)
TOTALS	**$4,746,286 (168)**	**$2,728,361 (113)**	**$109,076 (10)**	**$7,583,723 (291)**

NOTES:

* – Values shown are committed amounts. Because implementation dates vary, these figures differ from the audited financial statements.

** – Establishment grants not provided for Heritage Scientist awards if previously supported as Scholars

\+ – Values shown are committed amounts for approved Establishment Grants only.

1 – Includes Research Allowance for Full-Time Studentship, Full-Time Fellowship and Clinical Fellowship awards.

2 – Cross Cancer Institute awards

TABLE 2: SUMMARY APPLICATIONS RECEIVED AND PROCESSED DURING THE 1990-91 AWARD YEAR

Number of Applications Processed

	U OF A				U OF C				OTHERS				TOTALS			
AWARD CATEGORY	TOTAL	A	R	O	TOTAL	A	R	O	TOTAL	A	R	O	TOTAL	A	R	O
Studentship																
– Full-Time	**91**	34	57	0	**78**	33	42	3	**0**	0	0	0	**169**	67	99	3
– Part-Time	**4**	2	2	0	**0**	0	0	0	**0**	0	0	0	**4**	2	2	0
– Summer	**190**	90	93	7	**93**	39	50	4	**2**	1	0	1	**285**	130	143	12
Fellowship																
– Full-Time	**70**	24	44	2	**46**	13	30	3	**16**	13	3	0	**132**	50	77	5
– Part-Time	**2**	2	0	0	**0**	0	0	0	**0**	0	0	0	**2**	2	0	0
Clinical Fellowship	**6**	1	4	1	**6**	1	4	1	**5**	2	3	0	**17**	4	11	2
Clinical Investigatorship/ Establishment Grant	**2**	0	0	2	**6**	2	1	3	**0**	0	0	0	**8**	2	1	5
Scholarship/Establishment Grant	**19**	1	7	11	**14**	7	1	6	**0**	0	0	0	**33**	8	8	17
Heritage Medical Scientist/ Establishment Grant	**10**	4	5	1	**9**	0	9	0	**0**	0	0	0	**19**	4	14	1
Independent Establishment Grant	**5**	3	1	1	**2**	1	0	1	**0**	0	0	0	**7**	4	1	2
TOTALS	**399**	**161**	**213**	**25**	**254**	**96**	**137**	**21**	**23**	**16**	**6**	**1**	**676**	**273**	**356**	**47**

A = Approved R = Rejected O = Withdrawn/Pending

TABLE 3: GRANTS AND AWARDS RENEWED/ CONTINUED – 1990/91

Award Category	U of A Total	U of C Total	Others Total	Totals
Studentship				
– Full-Time	60	48	0	**108**
– Part-Time	1	0	0	**1**
Fellowship				
– Full-Time	21	26	8	**55**
– Part-Time	0	0	0	**0**
Clinical Fellowship	7	1	6	**14**
Clinical Investigatorship/ Establishment Grant	11	12	1	**24**
Scholarship/Establishment Grant	39*	56**	2	**97**
Heritage Medical Scientist/ Establishment Grant	8	11	1	**20**
TOTALS	**149**	**155**	**18**	**322**

* (1) Scholar supported for 2 months only; (1) Scholar supported for 3 months only; (1) Scholar for 7 months only

** (1) Scholar supported for 1 month only; (1) Scholar supported for 3 months only

TABLE 4: TOTAL AWARDS ACTIVE ON MARCH 31, 1991

Award Category	U of A Total	U of C Total	Others Total	Totals
Clinical Investigatorship/ Establishment Grant	14	14	1	29
Heritage Medical Scientist/ Establishment Grant	10	12	1	23
Heritage Scholarship/ Establishment Grant	38	58	2	98
TOTALS	**62**	**84**	**4***	**150**

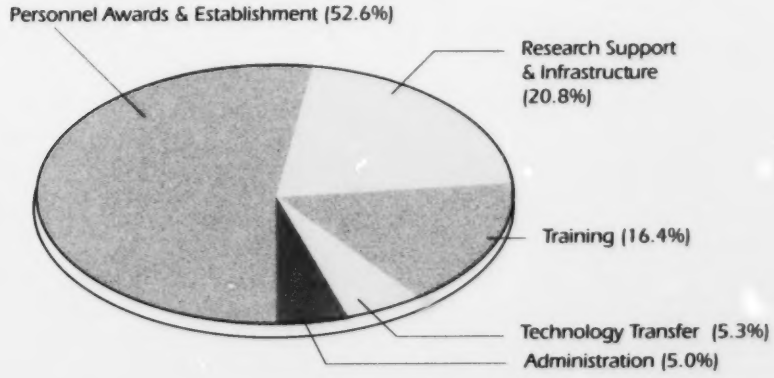
* Cross Cancer Institute Awards

TECHNOLOGY TRANSFER PROGRAM 1990-91

APPLICATIONS	RECEIVED	APPROVED	PENDING
Phase I	14 ($309,214)	6 ($124,249)	0
Phase II	10 ($712,190)	2 ($118,000)	0
Phase III	8 ($3,141,625)	3 ($1,100,000)	1 ($500,000)
TOTAL	**32 ($4,163,029)**	**11($1,342,249)**	**1 ($500,000)**

** Phase III are funded under the Alberta Medical Innovations Plan

AHFMR EXPENDITURES 1990-91



How is AHFMR Financed?

The Foundation operates on a portion of the interest revenue from the endowment fund established by the Government of Alberta after the Foundation was created by an Act of Legislation in 1979. The initial endowment was $300 million, an amount that has grown to $526 million (market value) under the astute stewardship of Alberta Treasury investment managers.

The types of investments made by Treasury partly depends upon the Foundation's cash requirements to run its programs. The money is transferred by Treasury from the interest income of the endowment and the amount transferred is listed under "revenue" in the financial statements. Any deficiency or excess of revenue in the statement of revenue and expenditure simply reflects a timing difference between expenditures and the transfers from Treasury.

In addition to revenue from the endowment, The Department of Technology, Research and Telecommunications has made available $9.3 million over five years to the Foundation to support Phase III technology commercialization grants. The $9.3 million was money transferred from the federal government to the province in 1989. As of March 31, 1991, the Foundation had received $6,066,000 under the agreement with TRT.

As currently operated, the Foundation is not able to accept donations from other sources.

WHAT IS THE SIGNIFICANCE OF THE ENDOWMENT GROWTH?

At first glance the over $500 million in the endowment fund seems healthy when compared to the initial $300 million, but its value in 1980 dollars is only $278 million. Even with prudent stewardship, the relentless onslaught of inflation has continuously decreased purchasing power. This is one reason the Foundation has asked the Government of Alberta to supplement the endowment.

HOW DOES THE FOUNDATION DECIDE HOW MUCH TO SPEND?

Final decisions for Foundation spending are made by the Trustees who weigh the mandate to support a balanced program of research that meets standards of excellence against available income, considering that a portion of the income must be added to the endowment to conserve purchasing power for the future.

In terms of the science, the trustees rely on the advice of the peer review panels which judge applications (see page 21) and on the international Scientific Advisory Council (See page 20) In terms of fiscal policy, the trustees look to the advice of financial experts and the experience and guidelines of many universities and other organizations supported by endowments.

FINANCIAL STATEMENTS

MARCH 31, 1991

Auditor's Report

To the Trustees of the Alberta Heritage Foundation for Medical Research

I have audited the balance sheet of the Alberta Heritage Foundation for Medical Research as at March 31, 1991 and the statements of revenue and expenditure – operating, revenue surplus – operating and revenue, expenditure and unexpended funds – Medical Innovation Program for the year then ended. These financial statements are the responsibility of the Foundation's management. My responsibility is to express an opinion on these financial statements based on my audit.

I conducted my audit in accordance with generally accepted auditing standards. Those standards require that I plan and perform an audit to obtain reasonable assurance whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation.

In my opinion, these financial statements present fairly, in all material respects, the financial position of the Foundation as at March 31, 1991 and the results of its operations and the changes in its financial position for the year then ended in accordance with generally accepted accounting principles.

Donald D. Salmon

FCA
Auditor General

Edmonton, Alberta
July 26, 1991

BALANCE SHEET

MARCH 31, 1991

	1991	1990
ASSETS		
Cash	$ 9,149,155	$7,764,986
Accounts receivable	107,895	14,183
Advances and prepaid expenses (Note 4)	371,423	537,494
Mortgages receivable (Note 5)	459,374	376,243
Capital assets (Note 6)	135,686	112,245
Deferred pension costs (Note 7)	87,616	72,338
	$10,311,149	**$8,877,489**
LIABILITIES, SURPLUS AND UNEXPENDED FUNDS		
Accounts payable	$ 1,591,250	$4,566,898
Revenue surplus	3,647,497	926,637
Medical Innovation Program - unexpended funds (Note 8)	5,072,402	3,383,954
	$10,311,149	**$8,877,489**

The accompanying notes are part of these financial statements.

STATEMENT OF REVENUE AND EXPENDITURE – OPERATING

FOR THE YEAR ENDED MARCH 31, 1991

	1991	1990
REVENUE		
Transfers from the Alberta Heritage Foundation for Medical Research Endowment Fund (Note 3)	$31,000,000	$28,500,000
Interest	653,187	805,606
	31,653,187	**29,305,606**
EXPENDITURE		
Scientific programs:		
Scholarship and establishment grants	7,990,232	8,724,732
Heritage medical scientist grants	3,399,133	2,759,163
Clinical investigatorship grants	3,052,483	2,524,838
Studentship grants and research allowances	2,403,088	2,740,923
Research support costs	2,296,744	2,341,855
Fellowship grants and research allowances	1,895,703	2,993,218
Independent establishment grants	1,430,866	1,297,236
Institutional grants	1,043,108	904,385
Building program grants	923,434	3,668,372
Major equipment and maintenance grants	863,480	1,422,003
Clinical fellowship grants	658,324	907,908
Technology transfer grants	408,610	339,746
Visiting lecturer grants to universities	345,659	354,672
Travel grants to universities	190,467	239,599
Technical workshop grants	185,353	111,238
Special initiative grants	178,596	314,378
Conference support grants	99,202	89,076
Computer grants	75,000	100,000
Library grants	38,767	117,633
Visiting scientist grants	23,662	37,795
Visiting professor honoraria and travel grants	13,500	18,539
Recruitment and planning grants to universities	6,870	8,519
Animal resources	–	25,000
Independent research allowances	–	21,700
Clinical trainee grants	–	11,500
	27,522,281	**32,074,028**
Administration expenses, Schedule 1	1,069,444	1,117,482
Scientific Advisory Council expenses	102,046	83,820
Trustee expenses	98,524	145,012
Other committee expenses	140,032	108,068
	28,932,327	**33,528,410**
Excess (deficiency) of revenue over expenditure for the year	**$ 2,720,860**	**$(4,222,804)**

STATEMENT OF REVENUE SURPLUS – OPERATING

FOR THE YEAR ENDED MARCH 31, 1991

	1991	1990
Revenue surplus at beginning of year	$ 926,637	$ 5,149,441
Excess (deficiency) of revenue over expenditure for the year	2,720,860	(4,222,804)
Revenue surplus at end of year	**$3,647,497**	**$ 926,637**

STATEMENT OF REVENUE, EXPENDITURE AND UNEXPENDED FUNDS - *Medical Innovation Program (Note 8)*

FOR THE YEAR ENDED MARCH 31, 1991

	1991	1990
REVENUE		
Contributions from the Province of Alberta – General Revenue Fund	$2,333,000	$3,733,000
Interest	626,261	262,669
	2,959,261	**3,995,669**
EXPENDITURE		
Projects funded	1,185,590	520,675
Consulting	44,069	70,968
Salaries	17,103	–
Legal	9,779	6,256
Travel and accommodation	9,677	13,681
Public relations and advertising	2,820	–
Telephone	1,026	–
Benefits	683	–
Other	66	–
Stationery	–	135
	1,270,813	**611,715**
Excess of revenue over expenditure for the year	1,688,448	3,383,954
Unexpended funds at beginning of year	3,383,954	–
Unexpended funds at end of year	**$5,072,402**	**$3,383,954**

NOTES TO THE FINANCIAL STATEMENTS

MARCH 31, 1991

Note 1: Authority

The Alberta Heritage Foundation for Medical Research operates under the authority of the Alberta Heritage Foundation for Medical Research Act, Chapter A-26, Revised Statutes of Alberta 1980, as amended.

Note 2: Significant Accounting Policies and Reporting Practices

Capital Assets and Amortization

Capital assets are shown at cost less accumulated amortization. Amortization is calculated on a straight-line basis at the following annual rates:

Furniture and office equipment	10%
Computer equipment	20%

Scientific Programs Expenditure

Building program grants are reported as expenditure in these financial statements as costs are reported by recipients. Other grants and allowances awarded by the Trustees of the Foundation are recorded as expenditure when the awardee has been notified of the amount of the award and all terms and conditions of eligibility for payment of the award have been met.

Changes in Financial Position

A statement of changes in financial position is not provided as disclosure in these financial statements is considered to be adequate.

Note 3: Alberta Heritage Foundation for Medical Research Endowment Fund

The Endowment Fund operates pursuant to the Alberta Heritage Foundation for Medical Research Act and consists of an initial endowment of $300,000,000 from the Alberta Heritage Savings Trust Fund together with cumulative earnings thereon, less cumulative transfers to the Foundation.

Transfers to the Foundation are available at the request of the Trustees of the Foundation provided that such transfers do not result in the net assets of the Endowment Fund, as valued at cost, being less than the initial endowment.

The net assets of the Endowment Fund at March 31, 1991, as valued at cost, amounted to approximately $495,000,000, and at market value to approximately $526,000,000.

Note 4: Advances and Prepaid Expenses

	1991	1990
Unexpended funds held by universities:		
Travel grants	$187,997	$132,764
Visiting lecturers' grants	154,801	138,160
Interest earned on building program grants	–	255,988
Prepaid administration expenses	28,625	10,582
	$371,423	**$537,494**

Note 5: Mortgages Receivable

As part of the Foundation's housing assistance program a non-interest bearing mortgage of $125,000 has been provided to the President of the Foundation. Repayments of $25,000 are required annually starting August 1, 1991.

Note 6: Capital Assets

	1991	1990
Furniture and equipment at cost	$550,976	$483,199
Less: Accumulated amortization	415,290	370,954
	$135,686	**$112,245**

Note 7: Pension Plan

The Foundation's pension plan is a defined benefit plan. Benefits are based on years of service and average salary in the final years of employment.

Pension expense includes the amortization of experience gains and losses. These amounts are being amortized on a straight-line basis over periods between 14 - 18 years. The cumulative difference between the amounts expensed and the funding contributions has been reflected in the balance sheet as deferred pension costs.

The plan status as at March 31, 1991 is as follows:

Assets	$467,000
Less: Actuarial value of accrued pension benefits	387,000
Excess balance	$ 80,000

Note 8: Medical Innovation Program

The Foundation administers funds for the Medical Innovation Program on behalf of the Minister of Technology, Research and Telecommunications. The program is scheduled to end March 31, 1996 at which time all unallocated and undisbursed funds will be returned to the Province of Alberta - General Revenue Fund.

Note 9: Commitments

As at March 31, 1991 the Foundation had committed $32,495,565 (1990 $38,343,462) for scientific programs:

Scholarship & establishment grants	$13,104,760
Heritage medical scientist grants	8,009,289
Research support costs	3,734,341
Clinical investigatorship grants	3,150,603
Studentship grants and research allowances	1,567,425
Fellowship grants and research allowances	910,307
Independent establishment grants	910,247
Institutional grants	344,292
Major equipment and maintenance grants	213,806
Clinical fellowship grants	199,705
Other grants and allowances	198,680
Special initiative grants	131,932
Visiting scientist grants	17,978
Visiting professor grants	2,200
	$32,495,565

These commitments pertain to the following fiscal years:

1991-92	$15,616,797
1992-93	8,389,696
1993-94	4,840,313
1994-95	2,455,211
1995-96	1,018,455
1996-97	175,093
	$32,495,565

Note 10: Comparative Figures

The 1990 figures have been reclassified where necessary to conform to 1991 presentation.

Note 11: Approval of Financial Statements

These financial statements were approved by management.

Schedule of Administration Expenses

SCHEDULE 1

FOR THE YEAR ENDED MARCH 31, 1991

	1991	1990
Salaries	$ 516,059	$ 486,204
Public relations and advertising	102,012	74,786
Employee benefits	68,742	49,432
Stationery, printing and office supplies	57,108	83,480
Consultancy	56,196	80,394
Amortization	47,407	58,099
Rental of premises	38,910	120,487
Travel and accommodation	36,265	40,087
Postage and courier	32,354	21,658
Recruitment	30,364	3,900
Maintenance	28,943	29,276
Telephone	18,484	17,677
Insurance	14,571	14,719
Vehicle	7,433	19,267
Contracted employment services	7,169	13,403
Legal	4,412	3,152
Miscellaneous	1,910	398
Staff training	1,105	1,063
	$1,069,444	**$1,117,482**